Protocol Development Summary

Protocol: Change through time of Prairie and Coastal Vegetation Communities [shortened name: Prairie Monitoring]

Parks where the Protocol will be implemented: SAJH, EBLA

Justification/Issues being addressed: Prairies were once an wide-ranging component of western Washington landscapes but today, fewer than 20 remnants remain in the southern Puget trough. These communities are an important component of landscapes in Ebey's Landing National Historical Reserve (EBLA) and San Juan Island National Historical Park (SAJH). The cultural landscape at Ebey's Landing National Historical Reserve contains many remnants of once extensive prairies. Historically, prairies provided an important visual and biologic component of the matrix of landscapes that today comprise the cultural landscape. The landscape in San Juan National Historical Park included large treeless areas prior to the arrival of Europeans in the 1800s (Agee, 1984; Avery, 2002). During the historic period of the Hudson Bay Company (1853), Bellevue Farm was established in the area now called American Camp and over 4,000 sheep, cattle, horses, and hogs grazed on much of the area. Additionally, farming and the introduction of rabbits altered the native prairies.

About 684 acres remain as prairies at American Camp in SAJH and 3,000 acres at EBLA. Although most of these prairies are dominated by introduced species such as bentgrass *(Agrostis sp.),* velvet grass *(Holcus lanatus),* Kentucky bluegrass *(Poa pratensis)*, quackgrass *(Agropyon repens)* and American vetch (*Vicia americana*), some native remnants with high species diversity remain in each park. Recently, experimental restoration was initiated on a 2.5-acre site in EBLA and a 3.5 acre area in SAJH. These projects have focused on control or removal of introduced species, initial introduction of native grasses, and later introduction of native forbs. Changes in climate as well as adjacent development may result in plant species composition, ground water, and associated changes in wildlife species. Due to the small, finite number of prairie remnants in western Washington, prairies in EBLA and SAJH will provide important baseline information on intra and interannual changes in native prairie plant composition and response of vegetation to climate change.

Specific Monitoring Questions and Objectives to be addressed by the Protocol:

- How are the distribution, size, and physiognomic structure of prairies in SAJH changing over time?
- Are the structure, composition, and diversity of plant communities changing over time? How is species richness in small, native prairie remnants changing over time?
- Is the distribution and abundance of priority exotic plant species changing over time?
- Is the vegetation structure and composition of restored areas becoming more similar to native, reference communities?

Specific objectives of the protocol are:

- Track location of the forest/prairie interface at ten year intervals. Track changes in the density of trees and shrubs in prairies of American Camp.
- Determine trends in distribution and abundance of native and exotic plant species across the prairies of EBLA and SAJH.
- Determine trends in species cover of native and exotic plant species in the native prairie remnants of EBLA and SAJH.
- Determine trends in species cover of native and exotic plant species in the restored prairies of EBLA and SAJH and compare these trends to reference communities.
- Determine short-term trends (five to ten years) in annual survival and growth of transplanted native grasses in restored areas in EBLA and SAJH.
- Determine trends in plant species cover in restored areas to evaluate how similar restored areas are to native reference communities in EBLA and SAJH.

Basic Approach:

1) Low-elevation (1:5,000 scale), stereo photography will be flown every ten years. After each flight, the prairies will be categorized by physiognomic class (based on encroachment of shrubs and trees) and boundaries of each type will be digitized.
2) Plant cover will be monitored in permanent plots established in both EBLA and SAJH. Sample design will be developed during the protocol development, but it is anticipated that three strata will used within the prairies: exotic dominated prairies, native remnants, and restored areas. Statistical analysis will be conducted on cover of selected species, species richness, and frequency or distribution of the species. "Selected" species will be defined for each sample area and may be the dominant species, native species of concern, specific exotic species, or a group of species such as the dominants or perhaps groups such as forbs, grasses, or sedges.

Principal Investigators and NPS lead:

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Development Schedule, Budget, and Expected Interim products:

FY2006: Consult with statisticians on sample design and sample size. Develop draft protocol for internal review. $12,320

FY2007: Submit protocol for peer review. Contract for the aerial photography of SAJH (last photos were in 1997) and begin GIS analysis. Photography will cost $15,000.

FY2008: Finalize protocols and implement long-term monitoring. $12,320.

References

Agee, J.K. 1984. Historic Landscapes of San Juan Island National Historical Park. Unpublished Report, National Park Service, Cooperative Park Studies Unit, College of Forest Resources, University of Washington, Seattle, Washington 98195, CPSU/UW 84/2, 46 pp.

Avery, C. 2002. San Juan Island National Historic Park: An environmental history. Unpublished prospectus, National Park Service 35 pp.